EXHIBIT C

Lu Response

IN THE UNITED STATES BANKRUPTCY COURT
FOR THE DISTRICT OF DELAWARE

In re: FTX TRADING LTD., *et al.*,[1] Debtors.	Chapter 11 Case No. 22-11068 (JTD) (Jointly Administered)

RESPONSE OF KEVIN LU TO EXPERT REPORT OF FOTIOS KONSTANTINIDIS

February 9, 2024

[1] The last four digits of FTX Trading Ltd.'s and Alameda Research LLC's tax identification number are 3288 and 4063 respectively. Due to the large number of debtor entities in these Chapter 11 Cases, a complete list of the Debtors and the last four digits of their federal tax identification numbers is not provided herein. A complete list of such information may be obtained on the website of the Debtors' claims and noticing agent at https://cases.ra.kroll.com/FTX. The principal place of business of Debtor Emergent Fidelity Technologies Ltd is Unit 3B, Bryson's Commercial Complex, Friars Hill Road, St. John's, Antigua and Barbuda.

I. INTRODUCTION

1. On December 27, 2023, the Debtors filed the *Declaration of Kevin Lu in Support of Motion of Debtors to Estimate Claims Based on Digital Assets* [D.I. 5204] (the "Initial Declaration").[2] Thereafter, I received a report authored by Fotios Konstantinidis on behalf of Maps Vault Limited and Oxygen Limited (the "Konstantinidis Report"), as well as a supplemental report by Mr. Konstantinidis on behalf of Fondation Serendipity, Fondation Elements, Serendipity Network Ltd and Liquidity Network Ltd. (the "Konstantinidis Supplemental Report").

2. I was asked by Sullivan & Cromwell LLP ("Counsel") to respond to Mr. Konstantinidis' criticisms of Coin Metrics' methodologies as set forth in my Initial Declaration.

II. RESPONSE

A. The Trading Price Data Sources Are Not Too Limited.

1. The Konstantinidis Report Fails to Acknowledge the Presence of Fake Volume Present in the Data Aggregators' Data He Suggests Relying On.

3. The Konstantinidis Report asserts that the data sources used in the Howell Report are too limited by citing data from three cryptocurrency data aggregators: CoinMarketCap, CoinGecko, and Coinpaprika. (*See* Konstantinidis Rep. ¶ 23.) The Konstantinidis Report asserts that the daily trading volume for MAPS, OXY, and SRM from the three data aggregators are generally higher than the daily trading volume used in the Howell Report. (*Id.*)

4. The Konstantinidis Report fails to acknowledge an essential characteristic of the cryptocurrency trading industry -- that a significant number of exchanges operate in

[2] Capitalized terms utilized but not otherwise defined herein are to be given the meanings ascribed to them in my Initial Declaration, the Konstantinidis Report or the Konstantinidis Supplemental Report, as applicable.

jurisdictions that do not oversee them with the same scrutiny as traditional financial institutions and often publish data that cannot be considered reliable due to practices such as wash trading and other methods that artificially inflate their reported trading activity. This "fake volume" problem is widely understood and acknowledged by market participants.

5. Relatively unknown exchanges operating in an unregulated manner have clear incentives to artificially inflate their reported trading volume. For example, high levels of reported trading volume are likely to elevate an exchange's visibility on data aggregators' websites. It can also project the facade of an exchange with many users and deep pools of liquidity, two characteristics that are attractive to market participants when evaluating trading venues.

6. One of the most influential studies on this topic was conducted by Bitwise Asset Management, Inc. ("Bitwise"). Bitwise submitted a study to the SEC in connection with Bitwise's filing for its Bitcoin exchange-traded fund that contained a data-driven examination of the efficiency and size of the Bitcoin spot market. The study concluded that, "the volume numbers reported by CoinMarketCap.com (and other data aggregators in the space) are surprising because they are wrong, wildly inflated by a combination of fake volume and wash trading that dramatically skews the public's view of the bitcoin market in a negative way."[3] Referring specifically to CoinMarketCap's reported volume, it found that "$10.5 billion out of the $11 billion in reported average spot bitcoin volume, or roughly 95% of all reported volume, is either fake volume or wash-trading."[4]

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[3] "Economic and Non-Economic Trading in Bitcoin: Exploring the Real Spot Market For The World's First Digital Commodity", Bitwise Asset Management, accessed February 8, 2024, https://www.sec.gov/comments/sr-nysearca-2019-01/srnysearca201901-5574233-185408.pdf, at 8.

[4] *Id.* at 35.

7. Bitwise utilized a methodology that examined 83 exchanges sourced from top bitcoin markets listed on CoinMarketCap. A data collection system was developed to collect order book and trades data from each of the 83 exchanges. Bitwise then applied three data-driven techniques to systematically identify exchanges with fake volume: trade size histograms, volume spike alignment, and spread patterning analysis.

8. These techniques allowed Bitwise to visualize the distribution of a specific metric of interest and found that a baseline set of six exchanges (that are not likely to have fake volume) exhibit a distribution that is markedly different from exchanges that report fake volume. In other words, a natural process generated by willing buyers and willing sellers, engaging in arm's length transactions, and formed by the competitive forces of supply and demand, will exhibit a distinct pattern in the data. Data generated by an artificial process, such as wash trading, will exhibit a different pattern in the data. Bitwise analyzed these distributions to devise tests for the presence of fake volume.

9. Bitwise found that 73 out of the 83 exchanges identified on CoinMarketCap failed one or more of the tests and concluded that 95% of the reported volume on CoinMarketCap is either fake or wash trading.[5] These results directly refute the reliability of CoinMarketCap's reported volume data, and Bitwise indicates that other data aggregators are similarly unreliable.[6]

10. After publication of Bitwise's study, it gained widespread attention and circulation within the cryptocurrency industry. Since publication, numerous other researchers

[5] *Id.* at 34.

[6] *Id.* at 8, 71.

have studied the same problem and independently reached similar conclusions.[7] The Bitwise study, and subsequent studies by other researchers, played a large role in educating market participants of the fake volume problem. Today, serious practitioners within the industry understand that data aggregators such as CoinMarketCap, CoinGecko, and Coinpaprika are not reliable sources for trading volume data.[8]

2. Volumes from Decentralized Exchanges are Already Included in the Reported Volume from Data Aggregators.

11. The Konstantinidis Report asserts that trading volume from decentralized exchanges should have been considered in the Howell Report. (*See* Konstantinidis Rep. ¶ 24.) However, it fails to mention that decentralized exchanges are already included in the coverage universes of data aggregators such as CoinMarketCap, CoinGecko, and Coinpaprika. This omission might lead readers to assume that the Konstantinidis Report proposes the appropriate trading volume figure as the sum of reported volume reported by data aggregators *and* the volume from decentralized exchanges. Such an assumption would be inaccurate because it would result in double-counting the volume from decentralized exchanges.

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[7] *See, e.g.*, Cong et al., *Crypto Wash Trading*, 69(11) Management Science 6427 (2023); Le Pennec et al., *Wash Trading at Cryptocurrency Exchanges*, 43 Finance Research Letters (2021); Arash Aloosh & Jiasun Li, *Direct Evidence of Bitcoin Wash Trading*, Management Science (2023) *available at* https://ssrn.com/abstract=3362153; Chen et al., *Do Cryptocurrency Exchanges Fake Trading Volumes? An Empirical Analysis of Wash Trading Based on Data Mining*, 586 Physica A: Statistical Mechanics and its Applications 126405 (2022).

[8] It should be noted that subsequent to the publication of the Bitwise study, CoinMarketCap released additional metrics to provide users with a greater level of transparency regarding which exchanges are likely to have non-economic or fake volume. CoinMarketCap released a confidence indicator that compares an exchange's reported volume with its estimate of an exchange's volume. CoinMarketCap also released a liquidity score representing the liquidity of an exchange. It is also my understanding that CoinMarketCap began excluding a particular exchange from reported volume calculations if the exchange has zero fees, provides incentives to users to trade, or if price outliers are detected. However, this represents the most cursory attempt at addressing the fake volume problem. These exclusion rules will only remove the most blatant and egregious instances of wash trading. Exchanges that wish to inflate their reported trading activity will usually attempt to obfuscate their methods. CoinMarketCap still makes no attempt at excluding such exchanges from its reported volume figures, and in fact will still include exchanges where its own confidence in the legitimacy of the reported volume is low to moderate.

3. The Howell Report Relied Upon a Reliable and Curated Dataset Maintained by Coin Metrics.

12. The fake volume reported by data aggregators can be further understood by examining the number of exchanges in the coverage universes of data aggregators compared to the number of exchanges covered by established data providers that primarily serve financial institutions. CoinMarketCap[9], CoinGecko[10], and Coinpaprika[11] cover 709 exchanges, 929 exchanges, and 320 exchanges, respectively. The large number of exchanges covered by these data aggregators indicate that the data aggregators have a low quality threshold for covering an exchange. For instance, CoinMarketCap imposes certain criteria for the listing of exchanges. These include having a functional website enabling users to view all market pairs, demonstrating trading volume that matches its API data, operating for a minimum of 60 days, and meeting a few other straightforward requirements.[12] Furthermore, CoinMarketCap offers a paid service for exchanges to expedite their listing on the platform, thereby creating an incentive to do so.[13] The data aggregators advocated by the Konstantinidis Report will generally list a wide selection of exchanges, even unknown ones that are likely to engage in wash trading.

13. This stands in stark contrast to the coverage universes of data providers, such as Coin Metrics, that serve financial institutions. Coin Metrics' coverage universe currently consists of 43 exchanges. The determination of this coverage universe is the result of attention to user feedback and requests garnered from our user base over the past five years. Coin Metrics

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9 https://coinmarketcap.com/.

10 https://www.coingecko.com/.

11 https://coinpaprika.com/.

12 CoinMarketCap, "Listings Criteria" (Dec. 2023), *available at* https://support.coinmarketcap.com/hc/en-us/articles/360043659351-Listings-Criteria.

13 CoinMarketCap, "CMC Priority (CMCP)" (Feb. 2024), *available at* https://support.coinmarketcap.com/hc/en-us/articles/16945563933723-CMC-Priority-CMCP#:~:text=(C)%20Pricing,assess%20the%20feasibility).

serves a user base consisting of established financial institutions and companies engaged in the digital assets industry. Coin Metrics' users represent active market participants and practitioners within the industry and independently determine the exchanges that they interact with and require data from, steering clear of obscure exchanges that may artificially inflate reported trading activity. Over time, this has resulted in a carefully curated exchange coverage universe maintained by Coin Metrics, shaped by the collective consensus of active market participants, and includes nearly all major exchanges that have a legitimate real-time presence with a minimum threshold for quality.

14. Other data providers similarly have a more curated exchange coverage universe. Kaiko covers 118 exchanges[14], Amberdata covers 39 exchanges[15], and Tardis.dev covers 32 exchanges[16]. There is a high degree of overlap in the coverage universe among these data providers and Coin Metrics. The number of exchanges covered are significantly less compared to data aggregators like CoinMarketCap, CoinGecko, and Coinpaprika. This is not a coincidence. It indicates that active market participants have collectively identified a relatively small set of exchanges that are relevant and are less likely to engage in manipulating their reported trading activity.

[14] Kaiko, "Kaiko Instruments Explorer," *available at* https://instruments.kaiko.com/#/exchanges.

[15] Amberdata, "Market Data Coverage (CEX)," *available at* https://docs.amberdata.io/docs/market-data-coverage; Amberdata, "DeFi Coverage (DEX & Lending)," *available at* https://docs.amberdata.io/docs/defi-dex-coverage; and Amberdata, "AD Derivatives Coverage," *available at* https://docs.amberdata.io/docs/ad-derivatives-coverage. Exchanges mentioned multiple times were counted only once.

[16] Tardis.dev, "Historical Data Details", *available at* https://docs.tardis.dev/historical-data-details. Exchanges mentioned multiple times were counted only once.

4. The Exchanges Selected in the Initial Declaration Differ from Those Utilized by Professor Howell for Valid Reason.

15. Mr. Konstantinidis states that the exchanges used with respect to calculations regarding MAPS, OXY, and SRM differ between the Initial Declaration and Howell Report. Specifically, he observes that (1) for MAPS, the Howell Report uses 3 exchanges while the Initial Declaration uses 1 exchange, (2) for OXY, the Howell Report uses 5 exchanges while the Initial Declaration uses 3 exchanges, and (3) for SRM, the Howell Report uses 18 exchanges while the Initial Declaration uses 12 exchanges. (*See* Konstantinidis Rep. ¶ 25.)[17]

16. There is a simple reason for the selection of different exchanges between the Initial Declaration and Howell Report. I selected the highest-quality constituent exchanges from a wide universe of exchanges for the purposes of calculating *prices* while Dr. Howell selected all potentially legitimate exchanges covered by Coin Metrics to calculate trading volume and volatility for the purposes of calculating an *asset liquidation discount*.

17. As I explain in the Initial Declaration, my methodology involves first generating a set of candidate markets for a given asset. I consider markets from a set of trusted exchanges if they exist, then use markets from low-rated exchanges if no markets from trusted exchanges exist, then use markets from the FTX exchanges as a last resort if markets on both trusted exchanges and untrusted exchanges do not exist. (*See* Initial Declaration ¶ 44.) Using the asset LTC as an example, this process generated a set of candidate markets from 18 unique exchanges. I then select a subset of these markets that I determine to be the highest-quality markets most suitable for the purposes of calculating prices. The methodology I employ prefers

[17] It is important to highlight that this observation actually contradicts the assertion made in the Konstantinidis Report that the Howell Report's selection of exchanges is too narrow. (*See* Konstantinidis Rep. ¶ 25.) For every asset raised by Mr. Konstantinidis, the Howell Report employs a *wider* selection of exchanges compared to those utilized in the Initial Declaration.

to select markets on exchanges rated highly by the Trusted Exchange Framework, with high volume, without the presence of price outliers, and with certain quote assets. (*See* Initial Declaration ¶ 45). In essence, my methodology addresses the question, "Among all markets where an asset is traded, which markets are the highest-quality and are most appropriate to serve as inputs in a price calculation?"

18. In applying this methodology to LTC, I selected markets that traded on 6 out of the 18 candidate exchanges. It is important to note that the selection of these 6 exchanges should not be interpreted as suggesting that only these 6 selected exchanges exhibit legitimate volume for this asset, nor should it imply that exchanges that were not selected lack legitimate volume. For the purpose of calculating prices, the methodology does not require a comprehensive accounting of all global trade volume. As long as the selected exchanges carry a significant portion of volume and are determined to have trustworthy and liquid operations, including more exchanges would not improve the quality of the calculated price. The considerations for determining an asset liquidation discount are different and were independently established by Professor Howell. Thus, there is a legitimate justification for the Initial Declaration's narrower exchange selection when compared to the Howell Report.

B. Mr. Konstantinidis' Assertion that the Coin Metrics Spot Price Valuation Interval is Arbitrary and Unsupported is Not Supported.

1. The Selection of a 60-Minute Calculation Window Was Determined Through Rigorous Review and is Consistent With Industry Standards.

19. Mr. Konstantinidis asserts that "[t]he methodology used by the Lu Report to calculate cryptocurrency spot prices, arbitrarily selects the volume (to calculate weights) and price of each cryptocurrency over the trailing 60 minutes before the Petition Date and Time (from all constituent markets)" because "it is not explained why the chosen interval was one hour before the Petition Date and Time, instead of a longer interval." (*See* Konstantinidis Rep. ¶ 26.)

20. The selection of a 60-minute calculation window was not arbitrary. During the development of the methodology for the Coin Metrics Prices, extensive backtesting and sensitivity analyses were performed to consider alternative methodologies and methodology parameters, including the length of the calculation window. The Coin Metrics Prices methodology was selected after a rigorous assessment of alternatives.

21. Part of these analyses involved examining the amount of volume present across several calculation windows for a wide selection of 200 of the top assets. Calculation windows shorter than 60 minutes and longer than 60 minutes were considered, ranging from 5 minutes to 240 minutes. The volume for each calculation window was examined at the 1st, 5th, and 50th percentiles over a period of 7 trading days to determine whether a particular calculation window contains sufficient volume to be used in weighting markets for the purposes of calculating prices. After reviewing the results of this analysis, a time window of 60 minutes was determined to strike the appropriate balance between timeliness, accuracy, and manipulation-resistance.

22. Moreover, usage of a 60-minute interval of data to calculate prices is well established in the industry and consistent with the methodologies offered by other price providers of digital assets:

- The CME CF Cryptocurrency Reference Rates utilizes a 60 minute TWAP period length in its methodology. This reference rate is used by the CME Group, one of the largest derivatives exchanges, to settle its Bitcoin and Ethereum derivatives.[18]

[18] CF Benchmarks Ltd., *CME CF Cryptocurrency Reference Rates* (Version 15.6, 2023) *available at* https://docs.cfbenchmarks.com/CME%20CF%20Reference%20Rates%20Methodology.pdf.

- The Fidelity Bitcoin Reference Rate uses a "volume weighted median price (VMWP) method, based on rolling sixty-minute increments."[19]

- The CoinShares Hourly Reference Rates utilizes a 60 minute calculation window in its methodology.[20]

- The Kaiko Digital Assets Rates utilizes a 60 minute calculation window for the daily fixing publication.[21]

- The Amber Data Hourly & Daily Reference Rates utilizes a lookback window of 60 minutes in its methodology.[22]

- The SIX Crypto Indices are calculated "by using the volume weighted average price over a rolling one hour time window".[23]

23. The Konstantinidis Report presents an example of asset prices if an interval of 12 hours was used instead. (*See* Konstantinidis Rep. ¶ 26.) It finds that prices for MAPS and SRM calculated using this method are higher than prices in the Initial Declaration. (*Id.*) This is an arbitrary window. Indeed, it is a trivial exercise to find specific assets and calculation windows that result in prices that are *lower* than the prices in the Initial Declaration. For example, if the calculation window is extended to 36 hours, the average price for OXY is 0.02893388, or 8 percent lower than the price in the Initial Declaration.[24]

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[19] Fidelity Investments, "Fidelity Bitcoin Reference Rate, Index Methodology Document" (January 2024), *available at* https://institutional.fidelity.com/app/literature/report/9911288/bitcoin-reference-rate-new-crypto-index-methodology.html, at 5.

[20] Compass Financial Technologies, "CoinShares Hourly Reference Rates Methodology" (2022), *available at* https://s3.amazonaws.com/a.storyblok.com/f/155294/x/304df8f9da/methodology_coinshares_hourly_reference_rates.pdf, at 5.

[21] Kaiko, "Kaiko Digital Assets Rates Rulebook" (Sept. 2022), *available at* https://marketing.kaiko.com/hubfs/Factsheets/Kaiko%20Price%20Rates%20Rulebook.pdf, at 10.

[22] Amberdata, "Hourly & Daily Reference Rates White Paper" (Version 1.0.0), *available at* https://go.amberdata.io/hubfs/AmberdataReferenceRatesv2.pdf, at 15.

[23] SIX, "SIX Crypto Indices" (2023), *available at* https://www.six-group.com/dam/download/market-data/indices/factsheets/factsheet-six-crypto-indices-en.pdf, at 1.

[24] This price was calculated as the simple average of the Coin Metrics Reference Rate at 1s frequency for OXY for the 12-hour period prior to the Petition Time, following a similar methodology to the one applied in the Kostantinidis Report. (*See* Konstantinidis Rep. n.32.)

24. Additionally, in contrast to the example provided in the Konstantinidis Report, my assignment was to determine the prices of specific spot assets at a precise timestamp – November 11, 2022, at 10:00 AM ET (the "Petition Time"). To achieve this, I employed a methodology that involves extracting prices from the most recent trades from each of the constituent markets immediately before the Petition Time. These extracted prices are then combined using a weighted-median approach, where the weights are derived from the 60-minute calculation immediately preceding the Petition Time.

25. For numerous digital assets priced in the Initial Declaration, the trades utilized as input data for the calculation occurred within a few seconds, or even less, of the Petition Time. As a result, the prices calculated using this method accurately reflect the market value precisely at the Petition Time. In simpler terms, my methodology calculates a measure of central tendency using the small number of trades that typically occur immediately prior to the Petition Time. In contrast, the example offered in the Konstantinidis Report represents the average price for all trades that lie the 12-hour window prior to the Petition Time, which would include trades that occurred a substantial amount of time prior to the Petition Time and is inconsistent with the parameters of my assignment. Unlike the method utilized in the Initial Declaration, Mr. Konstantinidis' proposed method is unlikely to result in the true Petition Time trading price of a digital asset.

2. A Longer Calculation Window Would Not Result in a Material Change in Prices.

26. In the previous section, I explained how the selection of a one-hour calculation window was based on a rigorous analysis and is consistent with industry standards. I also explained how a longer calculation window advocated by the Konstantinidis Report could,

in some cases, lower the prices of certain assets and furthermore would be inconsistent with the parameters of my assignment.

27. Notwithstanding these responses, I executed the steps in the methodology described in the Initial Declaration for MAPS, OXY, and SRM using a 12-hour calculation window (instead of a one-hour calculation window) to determine the impact, if any, on the resulting prices. I utilize a 12-hour window because the Konstantinidis Report cites a 12-hour calculation window as an example, and incorrectly concludes that modifying the methodology used in the Initial Declaration to use this window would generally increase the prices of MAPS, OXY, and SRM. (*See* Konstantinidis Rep. ¶ 26.)

28. This incorrect conclusion stems from Mr. Konstantinidis' misunderstanding of the methodology I used to calculate Petition Time prices for digital assets. The Konstantinidis Report asserts that prices were calculated using "volume-weighted averages from prices collected from selected cryptocurrency exchanges." (*See* Konstantinidis Rep. ¶ 20.) This is an incorrect characterization of the methodology.

29. As I stated in the previous section, the methodology used in the Initial Declaration involves the extraction of prices from the most recent trade from each of the constituent markets immediately before the Petition Time. These prices are then aggregated using a weighted-median approach (not weighted-average), where weights are determined using data in the calculation window. The total volume and variance of the trade prices during the calculation window are used to determine the weight assigned to each constituent market. It is important to note that the weights are relative to each market, meaning that expanding the calculation window will typically not have a significant impact on the weighting because the volume observed for each constituent market is increased. The methodology does not involve

calculating a weighted average from all trades in the calculation window as described by the Konstantinidis Report. I described in the previous section how such a methodology would not represent the trading price precisely at the Petition Time because it uses trades that occurred up to 12 hours prior to the Petition Time in its calculation. Prior research at Coin Metrics also indicates that methodologies utilizing weighted averages techniques are also more susceptible to outliers, flash crashes, and suspected market manipulation compared to methodologies, like the Coin Metrics Prices, that utilize weighted median techniques.[25]

30. More importantly, the weights are then used to select the median price among the most recent trades on each market. Even if the calculation window is changed, and the weights assigned to the constituent markets change, the methodology will ultimately select between prices from a limited pool of trades – one from each of the constituent markets.

31. In practice, when applying the methodology with a 12-hour calculation window instead of a one-hour calculation window, the final prices for MAPS, OXY, and SRM shifted from their original values of $0.0985, $0.0314, $0.372 to $0.0986, $0.0314, $0.375, respectively. This represents an immaterial difference of less than one percent.

C. The Confidence Interval is Not Incorrectly Used.

32. In the Initial Declaration, I describe the methodology used to calculate the confidence interval to obtain a measure of confidence or, inversely, the uncertainty of the prices calculated in my assignment. Within the Initial Declaration, I use the term "confidence interval" as a general term to refer to a numerical figure that represents the uncertainty in the calculation of the price. Mr. Konstantinidis raises objections to this terminology, asserting that the

[25] A weighted average gives undue influence to outliers because it considers every data point's magnitude, whereas a weighted median is less affected by outliers as it focuses on the middle value, which is less influenced by extreme values.

confidence interval does not adhere to the Konstantinidis Report's narrow definition of how a confidence interval should be defined, which is to construct a confidence interval by sampling a population and drawing inferences from this sample to the overall population. (*See* Konstantinidis Rep. ¶ 27.)

33. My explanation of the confidence interval in the Initial Declaration ensures clarity by not leaving the interpretation of the term "confidence interval" open-ended for the reader. Instead, I describe the complete methodology I used in calculating the confidence interval, so that there is complete transparency in the calculation, leaving no ambiguity in the understanding of the term "confidence interval" as it pertains to my work. The Konstantinidis Report may object to the use of terminology, however, it does not change the fact that this numerical figure represents the uncertainty of the prices calculated in my assignment.

34. Furthermore, traditional definitions of confidence intervals based on statistical theory do not appropriately address all the unique factors relevant to pricing digital assets. To illustrate this, I describe three examples in which a confidence interval calculated using a method advocated by the Konstantinidis Report leads to unintuitive results.

35. First, consider two assets X and Y. Asset X is represented by a dataset collected within the calculation window consisting of 2 trades, where both trades have a price of $100. Asset Y is represented by a dataset collected within the calculation window consisting of 20,000 trades, where all trades span a narrow range of prices between $99.99 and $100.01. Both assets X and Y have a mean price of $100.

36. A standard statistical method to calculate a confidence interval would find that there is no variability in the sample dataset for asset X and would result in a 95 percent confidence interval of ($100, $100) – the narrowest possible confidence interval with a range of

zero. Yet asset Y, which contains a level of variability that is non-zero but small in magnitude, would result in a confidence interval that is wider than that for asset X. This is an unintuitive result because there is a vast difference in the information content between an asset that has traded 2 times and an asset that has traded 20,000 times. A confidence interval appropriate for pricing digital assets could appropriately address this situation by assigning asset X with a wider confidence interval than asset Y because the lack of market activity for asset X results in more uncertainty in the determination of the price. Standard statistical methods for calculating confidence intervals fail to address this situation properly.

37. Second, related to the example above, consider an asset with only one trade in the calculation window. This is common for illiquid or infrequently traded digital assets. There is similarly no variability in the data for this asset. A confidence interval calculated using standard statistical methods would again result in a confidence interval with a range of zero, yet common sense dictates that the lack of trading data for pricing an illiquid asset should result in a confidence interval with a wide range reflecting a high degree of uncertainty in the price.

38. Third, consider an asset where the most recent trades available are one month prior to the Petition Time. This is common for illiquid digital assets or digital assets that have been delisted from exchanges. In this situation, a confidence interval calculated using standard statistical methods would fail to appropriately address the staleness of the data. The uncertainty in the determination of the price should rise as the data grows more stale, yet standard statistical methods have no way of incorporating this factor into the calculation.

39. This concept can be understood using an example involving a hypothetical poll gauging voters' preferences for political candidates. Let's assume this poll took place one year ago, and confidence intervals for the level of support for each candidate were computed

using standard statistical techniques. However, it is reasonable to infer that voter preferences have likely evolved over the past year.

40. This suggests that the confidence intervals, based on the original polling data, may underestimate the uncertainty in levels of support from today's perspective. The challenge lies in the fact that standard statistical techniques lack a mechanism to account for the potential divergence between a sample taken at a specific point in time and the evolving preferences of the underlying population over time. The time decay or "staleness" of the data becomes a crucial factor, particularly in the context of pricing digital assets, where the timeliness of the data is an essential variable in determining the uncertainty of the price.

41. For the reasons stated above, I devised a confidence interval calculation that more appropriately addresses factors unique and relevant to pricing digital assets. It adheres to the fundamental properties of valid confidence intervals, namely that a confidence interval should be a function of the size of the sample and the variability within the sample.

42. The variability within the sample is captured by the root mean squared difference ("RMSD") figure which measures the typical size of changes in price between adjacent trades. An asset with high price volatility would result in a high RMSD value and result in a wider confidence interval, holding all other variables constant.

43. The size of the sample is captured by assigning digital assets to certain bins based on the number of trades within the 10-minute window prior to the Petition Time. I find that the RMSD at the 95^{th} quantile is an inverse function of the number of trades. In other words, as the number of trades increases, the narrower the confidence interval, holding all other variables constant. I include the original table in the Initial Declaration for reference below.

Trade Count Bin	RMSD (95th Quantile)	Count
(2.0, 10.0)	0.103681	12
(10.0, 50.0)	0.063939	18
(50.0, 100.0)	0.031465	19
(100.0, 500.0)	0.014476	62
(500.0, 1000.0)	0.007280	39
(1000.0, 10000.0)	0.003351	57
(10000.0, 1000000.0)	0.001929	31

44. Mr. Konstantinidis takes issue with the extrapolation method used in the Initial Declaration in which I extrapolate the RMSD at the 95th quantile for the trade count bin [0, 2] due to a lack of observations. (*See* Konstantinidis Rep. ¶ 29.) The extrapolation method I used was to calculate the ratio of the RMSD at the 95th quantile between the (2.0, 10.0) bin and (10.0, 50.0) bin and apply this calculated ratio between the [0, 2.0] bin and (2.0, 10.0) bin to determine the value for the [0, 2.0] bin.

45. I decided upon the extrapolation method based on the observation that the RMSD at the 95th percentile of a given bin is roughly half the size of the value in the bin preceding it. The Konstantinidis Report asserts that the extrapolation method is not accurate because "the assumption that the ratio of RMSD values of two RMSD values of two consequent trade bins is constant, is not valid." (Konstantinidis Rep. ¶ 29.) Yet in the Initial Declaration, I never made the assumption that the ratio is constant. I stated that "the largest RMSD values of each band are roughly half of the RMSD before it". (*See* Initial Declaration ¶ 51.) The ratios for

adjacent bins, starting with the (2.0, 10.0] bin, are 0.61669, 0.49211, 0.460067, 0.502901, 0.460302, 0.575649. These ratios are consistent with the plain language meaning of "roughly half".

46. The Konstantinidis Report also asserts that no specific reason was given in choosing the number of bins. (*See* Konstantinidis Rep. ¶ 28.) This is also incorrect. In the Initial Declaration, I state "[t]he bins are chosen so that each bin is large enough to contain several digital assets, but granular enough to distinguish digital assets with few trades (e.g. 10 or less) from those with many trades." (*See* Initial Declaration ¶ 51.)

47. Finally, it should be noted that the confidence interval calculated in the Initial Declaration, based on my understanding, was not used as an input in the Howell Report nor is it used to estimate the value of creditors' claims.

Dated: February 9, 2024

/s/ Kevin Lu
Kevin Lu